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THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XV FEBRUARY, 1942 No. 2

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Power Factor Important in Induction Heat

Reported by Edward Troy
Metallurgist, Inland Steel Co.

Calumet Chapter—F. F. Vaughn, assistant chief metallurgist of the Caterpillar Tractor Co., addressed a dinner meeting on Dec. 9.

His subject was "Induction Hardening" but the lecture was confined principally to the metallurgical factors involved in "surface hardening" by the induction heating method.

The speaker stressed the importance of precise control of power input and duration in producing desired surface hardness and case depth. Graphs of the relation between kilowatt-seconds of current application and surface hardness showed that the latter increases with the kilowatt-seconds until solution is reached, after which the hardness falls off slightly accompanied by a coarsening of the structure at the surface.

The depth of hardened case which is harder than Rockwell C-50 was shown to increase directly with increased kilowatt-seconds. Using current of 3000-cycle frequency, the optimum depth was shown to be approximately 0.125 to 0.150 in.

Consequently, the parts requiring the maximum hardened depth are given

(Continued on Page 2)

Direct Radiant Gas Heating Adapted to Variety of Industries

Reported by Amos D. McGary
Metallurgist, International Chain & Mfg. Co.

York Chapter—Following committee reports by George J. O'Neil and N. J. Gebert, pertaining to defense projects now being carried out by chapter members, the technical address at the meeting on Jan. 14 was given by Frederic O. Hess, president of The Selas Co., Philadelphia.

Mr. Hess has described direct radiant gas heating in detail in an article in the February issue of METAL PROGRESS. There are in use today upwards of 30,000 direct-firing radiant burners of this type, adapted to a wide variety of industries.

At the close of Mr. Hess's talk there was a session of discussion and questions by various chapter members. Mr. Hess illustrated the fact that this method of heating is finding new applications in industry daily and is only in its infancy, despite the record it has already made.

Penn State Meeting Planned

The Fifth Biennial Inter-Chapter Meeting, sponsored by the Pennsylvania State Chapter of the A.S.M., will be held in State College, Pa. on April 24 and 25, 1942. Tentative program of the meeting, in which five chapters will participate, is given on page 2, bottom of second column.

A program is also being arranged for the ladies. Reservations should be made immediately with the Nittany Lion Inn, State College, Pa. for best accommodations.

Eight Past Chairmen Honored at Rockford

Past Chairmen of the Rockford Chapter Honored at a 20th Anniversary Banquet Were (Seated, Left to Right) O. T. Muehlemeyer, Charles Cotta, R. M. Smith, and John Nelson; (Standing) L. R. Foote, L. J. Strohmeyer, Present Chairman J. N. Harris, Freeman Anderson, and C. B. Sadtler.

Protective Coatings Save Scarce Metals

Reported by Harold H. Lurie
Chief Metallurgist, Cummins Engine Co.

Indianapolis Chapter—Ninety members and guests listened intently while Dr. R. M. Burns, assistant chemical director of the Bell Telephone Laboratories, talked on "Protective Coatings for Corrosion Prevention" at the meeting on Dec. 15.

With the great expansion in the production of equipment for defense purposes, we must give up some of the materials we normally used in applications where corrosion is encountered. This brings about the necessity of producing a good surface on an inferior material to obtain, as nearly as possible, equivalent results.

Plating copper, nickel and finally chromium on the surface of mild steel may sometimes be used to replace solid copper or brass parts.

Also it is more economical from the standpoint of metal consumed to use electroplated tin and zinc coatings instead of those produced by hot dipping.

Dr. Burns then discussed the mechanics and theory of corrosion and classified the various methods of corrosion prevention. His talk has been covered in this paper when it was given before other chapters of the Society.

Technical Papers Invited For Fall Metal Congress

ALL MEMBERS of the Society are cordially invited to submit technical papers to the Publication Committee for its consideration for presentation before the National Metal Congress and Exposition to be held in Detroit Oct. 12 to 16, 1942.

Three copies of the paper accompanied by three sets of drawings and illustrations must be sent to the National Office in Cleveland to the attention of Ray T. Bayless, assistant secretary, American Society for Metals, not later than June 20, 1942. Headquarters should be notified immediately of your intention to submit a paper.

Helpful suggestions for the preparation of technical papers will be sent to all who indicate their intention to submit papers.

Chapter History Traced at 20th Anniversary Banquet

Reported by V. C. Leatherby
Eclipse Fuel Engineering Co.

Rockford Chapter—Eight of the ten past chairmen were honored at the December meeting when the organization observed its 20th anniversary with a banquet at the Elks Club.

They were O. T. Muehlemeyer, Charles Cotta, R. M. Smith, John Nelson, L. R. Foote, L. J. Strohmeyer, Freeman Anderson and C. B. Sadtler.

Present Chairman J. N. Harris traced the national organization's history and presented certificates to former chairmen present. Mr. Muehlemeyer, first chairman, told of the founding and growth of the chapter.

Alan C. Mattison was presented with a gold wrist watch by C. R. Wiggins on behalf of the Society.

Swan Hillman was the Chapter's third chairman and the late C. R. Crain served as fifth chairman.

Stoughton and Eisenman Show How Industry and A.S.M. Assist War Effort

Reported by Colin G. Chisholm
Salesman, Columbia Steel Co.

Oregon Chapter—National Secretary Bill Eisenman was introduced at the January meeting by Chairman C. E. Thomas. Mr. Eisenman, in his inimitable fashion, described his and President Stoughton's present western trip, which includes many A.S.M. chapters.

He also gave a brief description of what the American Society for Metals has done and is doing to assist in the national war effort.

After a short intermission, Professor Thomas introduced Dr. Stoughton, national A.S.M. president, whose address was entitled "Metallurgy and Its Relationship to the National Defense". Dr. Stoughton described the changeover in industry, both from a physical and psychological point, from a defense program to a full war effort.

He related the part that the technical societies have been playing in alleviating the problem of shortages in the strategic metals by suggesting substitutes, and gave a general picture of the situation applying in critical metals such as iron, zinc, aluminum, copper.

Cites Electron Microscope's Use for Metals

Reported by Constance B. Brodie
Metallographer, General Electric Co.

Schenectady Chapter—The electron microscope as a new tool in metallography was introduced at the January meeting by Dr. David Harker of the General Electric Co. Research Laboratory. The RCA electron microscope and his method of examining metal samples were described.

As we know, the light microscope requires the absorption or reflection of light to give an image, but an image with the electron microscope is formed by the passage of electrons through a sample which cannot be more than about 1000Å (0.1μ) in thickness.

Film Made from Surface

This is thin enough to allow the electrons to pass through without being absorbed. If they were to be absorbed, the sample would burn up.

Since a metal sample cannot be sliced as thin as necessary, an impression of the surface of the metal is made on a film of Formvar. This film is made by dipping a lightly polished and etched metal sample into a 1% solution of Formvar in ethylene dichloride and evaporating the solvent.

The remaining film is stripped from the surface of the sample under water and will spread itself on the surface of the water, where it can be transferred to a 200-mesh screen, which acts as a specimen holder.

The actual preparation of the film from a sample by stripping can be done in a very few minutes. To observe and photograph the film, a vacuum is required and voltages should be from 30 to 60 kv.

Results on Metals Shown

Lantern slides of the construction of the microscope as well as some of the results were shown by Dr. Harker. They included copper-beryllium alloys, vanadium pentoxide, pearlite, martensite, and such things as stearic acid smoke particles.

Although the electron microscope has not reached the practical stage in metallography, its potentialities can be appreciated.

Compliments

To **Leslie S. Fletcher** of Frankford Arsenal, treasurer and active member of the Philadelphia Chapter, A.S.M., on his promotion from major to lieutenant colonel in the Ordnance Department, U. S. Army.

To **Detroit Chapter's A. L. Boegehold** of General Motors, E. N. Stilwill of Chrysler, and R. H. McCarroll of Ford —all appointed to the ten-man Senior Technical Advisory Committee to the War Production Board.

To **Bethlehem Steel Co.** on the award of the National Safety Council trophy for the plant having the lowest lost-time acident rate in its group.

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RAY T. BAYLESS.....*Editor*
M. R. HYSLOP.....*Managing Editor*

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Program for Ladies Night Is Mixture Of Fiction and Fact

Reported by Mrs. Walter Olden

Chicago Chapter—When the gentlemen members voted to have a "Ladies' Night", little did they realize what a memorable evening it would be.

In the spacious quarters of the Chicago Bar Association, on the night of Dec. 11, a swell crowd of A.S.M'ers gathered with their mothers, wives, daughters or sweethearts. After a delicious meal the members and their ladies sat back for an enlightening program.

A dramatic tale was enfolded by a titled and mysterious raconteuse, Mme. Ogulska. Her touching tale of espionage for the British Intelligence Service moved everyone nearly to tears. The climax was reached when the Madame unmasked "himself."

Turning from fiction to fact, came the informative talk by Major Whitney B. Hobbs, chief of the Ammunition Service, Chicago Ordnance District.

The major gave interesting highlights on the war and its production problems—the part the midwest is playing in producing defense weapons; The importance of "little parts" on defense orders; our advanced start in comparison with the beginning of World War I; the vital part the metallurgist plays; women and their place in the factory and the home. These were only some of the points mentioned.

Mention should also be made of the sparkle and wit of Chairman McMillan and the timely remarks of Ken Hobbie, who introduced the speaker.

Stagg Speaks at Baltimore

Reported by David K. Miller
Baltimore Manager, Crucible Steel Co. of America

Baltimore Chapter — Guest speaker on Jan. 19 was Howard J. Stagg, chief sales metallurgist of the Halcomb Steel Division of the Crucible Steel Co.

Mr. Stagg's lecture was on the use of molybdenum, molybdenum-tungsten, and molybdenum-vanadium high speed steels, and has been reported in the January issue of THE REVIEW.

About 75 members and guests were present for the dinner and the meeting. After Mr. Stagg's talk, a full technicolor movie on aluminum was presented by the Aluminum Co. of America.

Jeffries Stresses Necessity for a Full Realization of Situation in Strategic Metals; Speaks at Boston Chapter Sauveur Night

Reported by Paul Ffield
Materials Engineer, Bethlehem Shipbuilding Corp.

Boston Chapter—The annual Sauveur Memorial Dinner was held on Jan. 9. Lieutenant Hartley, R.N., engineering officer of H.M.S. Firedrake, was the coffee talker. Already a veteran of Tobruk and other action in the Mediterranean, the youthful lieutenant presented a real adventure story.

Chairman Burnett opened the technical session with an important announcement concerning the formation of the Boston A.S.M.-War Products Advisory Committee.

H. H. Lester, who was a close friend of Professor Sauveur, introduced Dr. Zay Jeffries, the principal speaker.

Dr. Jeffries opened his talk by recounting some of the incidents concerning his personal contacts with Dr. Sauveur.

Quotes Facts and Figures

A talk by Dr. Jeffries is always inspiring because of his method of presenting facts in a memorable manner. He amazed his audience by giving a most complete story on the situation as far as strategic metals are concerned, quoting figures without notes and giving an accurate evaluation of progress.

He particularly stressed the necessity for a full realization of the situation we are now facing.

Of particular interest was the way Dr. Jeffries traced the growth of the light metals, aluminum and magnesium. He noted that aircraft is dominant in this war and no nation can be dominant in aircraft without vast supplies of the light metals. Up to the present time Hitler has had the upper hand in aircraft but a turning point is on the way.

Al and Mg Production Encouraging

His report on the progress of aluminum and magnesium production in the United States was most encouraging.

A lively discussion under the able direction of Dr. Lester followed Dr. Jeffries' talk. It was closed when Major Gil Cox of Watertown Arsenal read off the names of six elements on which he would like additional information.

Without a moment's hesitation, Dr. Jeffries furnished the desired information without even asking that the question be repeated. The applause which followed indicated the Boston Chapter's appreciation of Dr. Jeffries' abilities as a speaker.

The meeting was brought to a close by a brief ceremony when Chairman Burnett presented to the speaker a photograph of Dr. Sauveur against a background of pearlite.

Program of Fifth Biennial Inter-Chapter Meeting ASM

Pennsylvania State College
April 24 and 25, 1942

FRIDAY, APRIL 24

2:00 P. M. Technical Session
Mechanical Property Tests
CHAIRMAN: Col. J. L. Guion

1. *Mechanical Property Tests of Metals and Their Significance*, by R. L. Templin, Aluminum Co. of America.
2. *The Use of Mechanical Property Tests on the Inspection of Materials*, by O. J. Horger, Timken Roller Bearing Co.

6:00 P. M. Informal Dinner at Nittany Lion Inn

SATURDAY, APRIL 25

9:00 A. M. Technical Session
Metallurgy of Welding
CHAIRMAN: Col. G. F. Jenks

1. Paper by Charles H. Jennings, Westinghouse Elec. & Mfg. Co. *(Title to be announced)*
2. Paper by W. G. Theisinger, Lukens Steel Co. *(Title to be announced)*

Transactions Papers Are Available for Discussion

THE FOLLOWING papers are in preparation for publication in the TRANSACTIONS of the Society and anyone interested in receiving a copy for the purpose of submitting written discussion can receive galley proofs by notifying the National Office:

The Self-Diffusion of Copper, by C. L. Raynor, L. Thomassen and L. J. Rouse.

Metallurgical Control of Induction Hardening, by F. F. Vaughn, V. R. Farlow and E. R. Meyer.

The Effect of Normal Elements and Alloy Elements on the Rate of Austenite Transformation in Cast Iron at Constant Temperature, by C. Nagler and W. P. Wood.

Desirable Structure for Wear Resistance Shown

Reported by James W. Poynter
Asst. Met., Army Air Corps, Wright Field

Dayton Chapter—The January meeting featured a discussion of "Frictional Wear Resistance of Cast Iron" by Fred G. Sefing, metallurgist, International Nickel Co.

The distribution of the graphite and the microstructure determine the wear resistance. Thin graphite flakes in a uniform and random distribution with a fine pearlitic structure are the most desirable. Free carbides and a dendritic graphite-pearlite structure are undesirable.

William Sanders presented the coffee talk on "This Yellow Jacket Situation".

It was announced that the educational course beginning on Jan. 21 would be based on the A.S.M. course "What Steel Shall I Use" by Gordon T. Williams.

Power Control Necessary In Induction Hardening

(Continued from Page 1)

a relatively long heating time compared with parts in which maximum surface hardness is the primary requirement. In the latter case, the resulting surface can be made harder than is possible with conventional hardening methods.

Mr. Vaughn cited many interesting examples of application of induction hardening to tractor parts. Several million parts have been successfully hardened by this method and it is currently used on many shafts, track pins, chain sprockets, track rollers, and even on the bore of cast iron cylinder liners.

A. N. Lindberg, Chicago Heat Treater, Dies

A. N. LINDBERG, president of The Lindberg Engineering Co. and The Lindberg Steel Treating Co., died in Chicago, on Feb. 2.

A. N. Lindberg

Mr. Lindberg was born at Närke, Sweden, in 1875 and came to the United States at the time of the Columbian Exposition in 1893. As a young man he had worked in the steel mills in Sweden, and his first work in this country was as a blacksmith.

He was employed at the Crane Co., Fairbanks Morse Co., National Sewing Machine Co., and Krasberg and Sons of Chicago. He established the Lindberg Steel Treating Co. in 1921, and in 1935 with F. A. Hansen and C. H. Stevenson, formed the Lindberg Engineering Co.

For many years an active member of the Chicago Chapter A.S.M., Mr. Lindberg was also a past president of the Metal Treating Institute, and a member of the Special Tool and Die Association of Chicago.

Albert J. Dornblatt

ALBERT J. DORNBLATT, research metallurgist, Crown Cork and Seal Co., and active member of the Baltimore Chapter, died suddenly on Feb. 1.

Before joining Crown Cork and Seal, Dr. Dornblatt had been research associate at the National Bureau of Standards in the employ of the American Metal Co., Ltd. From 1929 to 1937 he had been head of the Department of Metallurgy & Chemistry, U. S. Naval Academy Postgraduate School.

Dr. Dornblatt enjoyed a national reputation for his research work in metallurgy, and had won fame as coauthor of the monumental "Engineering Alloys" published with Norman E. Woldman in 1936.

F. A. Fahrenwald

FRANK ALFRED FAHRENWALD, president of the Fahralloy Co. of Harvey, Ill., was killed instantly in an automobile accident last October.

Dr. Fahrenwald was born in 1887 in Yankton, South Dakota. Completing his course in metallurgical engineering in the South Dakota School of Mines in 1912, he received his Ph.D. degree from the University of Michigan.

He was a member of many engineering societies and widely known as an inventor of numerous machines, processes and special alloys. His latest invention is a new process of producing powdered iron of high purity direct from iron ore.

He was a recognized international authority in the field of ferrous metallurgy, and in this capacity was consultant to many companies in the United States and Canada and to the U. S. Government.

Elmer M. Dixon

ELMER M. DIXON died suddenly on Jan. 22. He had been associated with the John A. Roebling Sons Co. as a sales representative for 37 years, most of which was spent in Detroit.

L. S. Peregoy

LAMAR S. PEREGOY, president of Sivyer Steel Casting Co., Milwaukee Chapter sustaining member, died on Friday, Jan. 2.

Welding Practice Will Depend on Desired Properties of Weld

Reported by John P. Beal, Jr.
Metallurgist, Universal-Cyclops Steel Corp.

Northwestern Pennsylvania Chapter—An excellent talk on the "Metallurgical Aspects of Welding" was given by Charles H. Jennings of the Westinghouse Electric & Mfg. Co., at the December dinner meeting.

Mr. Jennings was introduced by Walter Johnson of the National Forge & Ordnance Co., who also led the discussion.

The talk revolved around three main points: *(a)* How welding procedure affects a weld, *(b)* the general weldability of a material, and *(c)* problems involved in welding dissimilar metals.

Under the first heading Mr. Jennings pointed out that the general welding practice has a very definite relationship to the character of the finished weld and that after deciding what the properties of the finished weld must be, a welding practice to give those properties must be devised.

The speaker gave several definitions of weldability and described a method of determining whether or not a metal can be satisfactorily welded. This method involves converting all the elements contained in the steel to equivalent carbon ratio.

Austenitic steels are often more easily welded than other steels because there is no critical change in cooling and, therefore, no great volume change to produce cracks around the weld.

In concluding his talk, Mr. Jennings discussed some of the problems of welding dissimilar metals, explaining the functions of dilution of the deposit by the parent metal. The speaker cautioned that, when welding dissimilar metals, the weld must have proper physical properties for the service for which the material is to be used.

Mr. Jennings' talk was of inestimable value to those concerned with welding and of great interest to the layman.

A. S. M. National Officers Chat With Long-Time Chapter Secretary

President and Secretary Visit North West Chapter

North West Chapter—National Officers' Night was held on Friday, Jan. 9. The session was presided over by R. L. Dowdell, professor of metallography, University of Minnesota, in the absence of Chairman R. W. Bingham.

Dr. Dowdell called on Secretary Bill Eisenman who outlined the activities of the society and gave a detailed description of the role of the A.S.M. in national defense. The make-up of the A.S.M. war products advisory committees was described in detail.

At the close of Bill's talk the chairman called on President Bradley Stoughton who spoke on "Metallurgy and its Relationship to the National Defense". General discussion followed this timely and important talk.

Two of the Oldest Secretaries in Point of Service With the A.S.M. Are Shown in This Photograph. At left is Alexis Caswell, who has been secretary of the North West Chapter since its formation 21 years ago. Bill Eisenman, at the right, has been secretary of the national organization for 24 years. Center is National President Bradley Stoughton.

On Land, on Sea, in the Air—Aluminum Aids Defense With Lightness and Strength

Reported by Verner Lindstrom
Research Laboratory, Linde Air Products Co.

Buffalo Chapter — In streamlined trains, tank motors, crane booms, bombers and destroyers; on land, in the air and on the sea; aluminum, too, makes a big difference. The reason is lightness plus strength, as P. V. Faragher of the Aluminum Co. of America emphasized in his talk on "Aluminum in Defense" before the December meeting.

The virtues of aluminum are many: Resistance to corrosion, conductivity to electricity and heat, reflectivity to radiant energy, and ease of fabrication. These, in combination with lightness and strength, make its production in great quantities vital to the nation. Mr. Faragher left no doubt that it is being provided at an accelerating pace.

Four Raw Materials Required

Aluminum is the most abundant of all metals in the earth's crust but the chief ore is bauxite, a mixture of hydrated aluminum oxides. Very little pure aluminum was produced until the Hall process was developed in 1886.

This method is essentially unchanged today. It depends upon the electrolytic reduction of the bauxite ore which is dissolved in molten cryolite. This is done in a cell consisting of a carbon-lined steel box and carbon electrodes. Thus the aluminum industry requires an adequate supply of bauxite, cryolite, carbon and electric power.

Bauxite is obtained in several of the southern states as well as in South America. Cryolite, a sodium aluminum fluoride, is found only in Greenland but fortunately it is not used up in the refining process, and moreover, it may be manufactured.

About 10 kw-hr. of electricity is required for each pound of aluminum made. The serious depletion in the potential supply of hydro-electric power in the South caused by drought has recently been considerably remedied by rain. This is also being off-set by power from sources using coal.

Hardening Types Compared

Mr. Faragher discussed the alloys of aluminum in detail and compared the properties of hardening types. The choice, for example, between the magnesium-silicon type and the copper type is one between corrosion resistance and maximum strength, which would be governed by the application.

After the lecture, Mr. Faragher was besieged by questions both from those who desired enlargement of points mentioned and from those who had shop kinks to be ironed out.

This discussion covered just about everything from surface tests for anodic film and alclad to the proper heat treatment of 14S to avoid susceptibility to intergranular corrosion. It was with reluctance that Mr. Crafts, who presided, finally closed the meeting.

Sensitive Balance Seen in Cast Iron Metallurgy

McElwee Makes Plea for Sound Specification Writing

Reported by Walter G. Patton
Climax Molybdenum Laboratory

Detroit Chapter—A.S.M. members have learned in the brief interval since Pearl Harbor that many things can happen to a technical program involving the production of war materials. At a late hour, the bars of censorship were dropped on the scheduled program for January, "Heat Treatment Problems in National Defense".

R. G. McElwee

The program committee, a little bit desperate perhaps, immediately conscripted R. G. McElwee, of the Vanadium Corp., to speak. Mac's talk, originally scheduled for the March meeting, had to be rushed through in great haste to meet the new deadline.

The result of all these last-minute preparations might have been a mediocre talk. Instead, it was probably the most widely and favorably discussed of any recently presented.

Compares Iron and Steel Metallurgy

The speaker covered an unusually broad range of subjects, tying in his remarks effectively with the dilemma in which the foundryman finds himself while American industry scrambles to put itself on a war footing.

Opening his talk with a comparison between iron and steel metallurgy, Mr. McElwee pointed out the metallurgical complications that are introduced by the all-important iron-silicon balance in cast iron and explained why the factor of time is so important in the production of sound, tough iron.

Certain anomalies that may occur served to illustrate further the sensitive balance that prevails in cast iron metallurgy. A little vanadium, the speaker said, can make cast iron soft; a little more—and very little more—will increase the hardness markedly.

A corollary to this complex system of reactions and forces is the fact that, so far as cast iron is concerned, the equilibrium diagram should be regarded as a series of zones rather than as simple lines. The usefulness of the Maurer diagram as a guide to carbon and silicon solubility was discussed.

Mr. McElwee made an earnest plea for sound specification writing, pointing out that buyers of castings could easily write specifications that were impossible for foundrymen to meet. On the other hand, he said, there may be an urge in times like these for foundrymen to "stretch" a familiar base iron analysis beyond its proper field of application in order to get business.

Heat Treatment Misunderstood

The speaker warned that this practice could only lead to the revival of the misguided notion that cast iron is an unsound and unsatisfactory material for engineering purposes.

As an example of sound specification writing, Mr. McElwee explained, step by step, the building of a brake drum specification, based on the demonstrated resistance of high carbon iron to heat checking.

The speaker pointed out that the heat treatment of cast iron is widely misunderstood and emphasized how important it is to control the time element during heat treatment. The use of the interrupted quench and isothermal treatment were cited as examples of highly promising developments in cast iron metallurgy.

A. L. Boegehold served as technical chairman of the meeting, supplementing the remarks of the speaker with his own experiences.

W. P. Woodside, past president and founder member of A.S.M., introduced Malcolm Bingay, well-known columnist of the *Detroit Free Press*, who gave the coffee talk, discussing the role of American democracy in a war-torn world as well as in times of peace.

Beard Is Speaker at New York

Reported by Ellis Blade
Consulting Engineer, New York City

New York Chapter—"Selection of Cutting Oils as Affected by Machinability" was the timely subject chosen by J. T. Beard of Socony-Vacuum Oil Co., in an address on Jan. 12.

Mr. Beard's talk was reported in detail in the January issue of THE REVIEW, page 3.

Well-Distributed Graphite Increases Wear Resistance

Reported by R. E. Christin
Metallurgist, Columbus Bolt Works Co.

Columbus Chapter—John W. Barnet of Battelle Memorial Institute has been appointed chairman of the newly organized War Products Advisory Committee of Columbus.

At the Jan. 6th meeting, Fred G. Sefing of the International Nickel Co. Development and Research Department delivered a most instructive illustrated lecture on the frictional wear resistance of cast irons.

The speaker stated that scoring, galling and seizure are different degrees of wear, and good wearing qualities are the result of good graphite, good matrix, and good hardness.

Well-distributed graphite provides small pockets for oil. Increased hardness increases wear if a desirable graphite pattern and the proper matrix are present.

Present foundry practice provides great improvement in the microstructure of cast iron and one needs only to request high wear resistance cast iron from the up-to-date foundry.

ASM-WAR PRODUCTS ADVISORY COMMITTEES

BECAUSE so many metal problems are involved in war-time production, the local chapters of the American Society for Metals have organized War Products Advisory Committees as a *free* advisory service for the metal producing and metal working industries. These ASM-War Products Advisory Committees will meet regularly. Every manufacturer of war products is invited to avail himself of these meetings.

If you have a problem, do not hesitate to get in touch with your local committee. Write or phone the coordinator, chairman, secretary or problem recorder as indicated in the list of committees on this page.

The work of the ASM-War Products Advisory Committees is solely a contribution to present war-time efforts. No financial considerations will be involved. You need not be a member of the American Society for Metals to obtain this service. *You will not be solicited for membership.* This is a sincere effort on the part of the chapters of the ASM to make a valuable contribution to "Ultimate Victory".

Baltimore Chapter ASM-WPAC

J. B. Armstrong, Chief Chemist, Bethlehem Steel Co.; Howes Bodfish, Aluminum Co. of America; C. L. Elgert, E. F. Houghton & Co., Inc., A. L. Feild, Director of Research, Rustless Iron & Steel Corp.; A. J. Fisher, Bethlehem Steel Co., Jesse Hakes, President, Baltimore Tool Works; R. B. Hoffmeister, Crown Cork & Seal Co.; Edwin Horlebein, President, Gibson & Kirk Co.; William J. Hunt, Proprietor, Hunt Mfg. Co.; William Inman, Allegheny Ludlum Steel Co.; Tilman Isaacs, Baltimore & Ohio Railroad; T. C. Jarrett, Research Metallurgical Engineer, American Hammered Piston Ring Division, Koppers Co.; T. R. Koons, Black & Decker Mfg. Co.; J. W. Miller, Metallurgist, Reid-Avery Co.; C. H. Proffen, Purchasing Agent, Charles T. Brandt, Inc.; S. Proctor Rodgers, Industrial Fuel Engineer, Consolidated Gas, Electric Light & Power Co.; F. G. Roemer, Balmar Corp.; A. R. Stargardter, Chief Metallurgist, Eastern Rolling Mill Co.; George J. Stevens, Research Machinist, Rustless Iron & Steel Corp.; Norman B. Tompkins, Crucible Steel Co. of America; R. E. Vining, Supervisor, Methods Department, Revere Copper and Brass, Inc.

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Dial 5151

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Speed Gained In Induction Heating Method

Reported by W. E. Bancroft
Metallurgist, Pratt & Whitney Division

Hartford Chapter — Speed was the keynote of two very interesting talks heard on Tuesday evening, Jan. 13. Those 40-odd members who attended the dinner were very much impressed by the impromptu talk given by C. M. Root, research engineer of the John Bean Mfg. Co. of Lansing, Mich. Mr. Root described recent developments in fire fighting equipment manufactured by his company.

The main address of the evening was given by H. E. Somes, chief engineer of Budd Induction Heating, Inc., Detroit. Mr. Somes placed emphasis on the speed with which hardening can be accomplished by the use of the induction heating process.

Hardening Takes Only Seconds

He showed moving pictures and slides illustrating the operation of the induction hardening machines for internal surfaces and the metallurgical results obtained by this process.

With such equipment the hardening times for complete pieces are measured in seconds, since induction heating is capable of raising the temperature of certain sections of the work at the rate of 1000 to 2000° per sec.!

According to Mr. Somes, steel which has been hardened by this method appears to have slightly different physical properties than obtained by conventional hardening methods, since surfaces Rockwelling C-64 to 65 can be successfully machined, if necessary, after hardening, using tungsten carbide tools. Photomicrographs do not entirely tell the reason for this, but they do show that the structure is very fine-grained and somewhat different in appearance from ordinary martensite.

Cylindrical Bores Treated

Since this process is so very rapid and produces a clean and comparatively scale-free surface with a minimum amount of distortion, Mr. Somes stated that it is common practice to install induction heating machines for hardening internal surfaces of cylindrical pieces in production lines whereby the hardening process may be accomplished with a minimum delay and consequent saving of time and money over conventional methods.

Mr. Somes also mentioned the use of induction heating methods for annealing and forging. It is not necessary to confine this method to steel parts since it is entirely possible to heat certain non-ferrous material, including brasses and bronzes, by means of electric induction.

It seems that the principle involved here is that the poorer the electrical conductivity of the metal the easier it would be to heat it by induced currents.

The meeting was attended by some 250 members and guests, and a lively discussion period followed the speaker's formal talk. Altogether this was one of the best meetings the Hartford Chapter has held this year, and furnished a highly satisfactory start for the new year of 1942.

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Present Program at Worcester Meeting

All Attendance Records Were Broken at the Dec. 17th Meeting of the Worcester Chapter. Left is Paul F. Pfau of Wyman Gordon Co., technical chairman; L. W. Davis, chief metallurgist of the Aluminum Co. of America Forging Division, speaker of the evening (center); and Dwight C. Daniels, manager of the local OPM Division of Contract Distribution Office.

Statistics, Forging Problems Covered in Talk on "Aluminum Bundles for Britain"

Reported by John R. Dobie
American Steel & Wire Co.

Worcester Chapter—The Dec. 17th meeting was held in conjunction with the Worcester Engineering Society, the Chamber of Commerce, and the Chemists Club. The record-breaking attendance was well over 300.

Under the timely subject of "Aluminum Bundles for Britain", L. W. Davis, chief metallurgist of the forging division, Aluminum Co. of America, gave an insight into the aluminum situation.

He stated that when present construction projects in the U. S. are completed we will have the capacity to produce sufficient aluminum for 4000 miscellaneous airplanes per month by the end of 1942. In addition there will be a small amount available for non-defense purposes.

Aluminum Production Filmed

Mr. Davis commended the Worcester concerns for the work they are doing on aluminum forging, as observed in his afternoon's visitations to local plants and the interesting exhibit at the meeting.

Through the media of two motion pictures the general steps in aluminum production were shown from the mine to the finished product. After this Mr. Davis traced the production of aluminum forgings from its infancy in 1929 with less than 2,000,000 lb. to a probable 1942 production of 60,000,000.

With the help of slides he explained in a general way the various types of aluminum alloys and their properties and applications.

Delving into the aluminum forging problems, he spoke on importance of flow line heating atmosphere, temperature control, heat treatment, straightening, and acceptance tests.

In respect to shortages he emphasized the importance of strict scrap separation for the purpose of classification in remelting. The greatest contributory factor, he said, however, is lack of proper scheduling.

Also manufacturers themselves could simplify the situation by lowering the required physicals on lower stressed parts.

Under the able guidance of Paul Pfau, technical chairman for the meeting, a lively question period followed.

The meeting was preceded by a dinner session when Dwight C. Daniels, local manager of the Division of Contract Distribution, O.P.M., stressed the vital need for small manufacturers to get all business possible.

Carburizing Practice at Fafnir Company Reviewed

Reported by H. C. Miller
Foreman, Greenfield Tap & Die Co.

Springfield Chapter—Carl Hewitt, metallurgist for the Fafnir Roller Bearing Co., New Britain, Conn., spoke on "Carburizing" at the December meeting. Mr. Stonerod, technical chairman of the evening, introduced Mr. Hewitt and also helped to conduct the question and answer period which followed the talk.

After giving a brief history of carburizing and a description of the process as practiced at the Fafnir Co., he presented slides showing a number of different furnaces in use today. Mr. Hewitt made his talk rather brief so as to devote more time to the question and answer period.

The meeting was adjourned after a lively discussion and a rising vote of thanks to Mr. Hewitt.

Movie Shows Manufacture Of Al Bronze Castings

Reported by F. N. Meyer
Technical Supervisor, Waterbury Branch
American Brass Co.

New Haven Chapter—The January meeting was held in Waterbury on the 15th of the month with W. B. Scott, field engineer for the Ampco Metal Co., Milwaukee, as speaker on "Modern Bronzes".

L. A. Ward, manager of mill control of the Chase Brass & Copper Co., was technical chairman.

Mr. Scott showed a movie depicting the process of manufacture of aluminum bronze castings for tools, aircraft parts, and gears. This movie included scenes showing the melting, casting (both the conventional sand and the centrifugal type), the machining operations, laboratory and shop inspection of finished castings, and finished parts.

Mr. Scott then gave a talk illustrated with lantern slides showing the composition, physical properties, and structure of the various common bronzes, including the lead, tin, nickel, manganese, and aluminum bronzes. The latter were covered very thoroughly, particular stress being placed on the importance of exact control of composition and heat treatment to obtain the optimum physical properties.

Following Mr. Scott's talk numerous questions on the control and application of aluminum bronze were asked by members of the audience.

Bolts Are Defined, Classified as to Low Or Medium Carbon

Reported by James C. Erickson
Deere & Co.

Tri-City Chapter — Speaking on "Bolts — Materials, Treatment and Properties" at the December meeting, A. S. Jameson, metallurgist, International Harvester Co., Chicago, defined bolts as fastening devices which must be plastic enough that they will not snap, but rather give a little when in service.

Bolts may be classified into two groups: *(a)* Low carbon steel bolts with a carbon range of 0.18 to 0.22%, and *(b)* medium carbon steel bolts with a carbon range of 0.30 to 0.45%. Medium carbon bolts may also be divided into the plain carbon steel bolts and the alloy steel bolts.

Two common processes of producing bolts are the hot forming process and the cold forming process.

The strength of hot-formed bolts varies with the chemical composition. An increase of carbon and manganese results in an increase in strength.

The yield strength of hot-formed low carbon steel bolts may be increased 5,000 psi. by an increase of 0.30% in manganese, while that of medium carbon bolts is increased the same amount by an increase of only 0.10% of manganese. However, with the increase of carbon and manganese, the plasticity of the bolt is decreased.

The most popular bolt making process is the cold heading of cold drawn wire. The effect of cold drawing is to increase the tensile strength.

With an increase of cold reduction, however, the ductile properties decrease. For this reason then, only one draft of the wire can be made, since enough plasticity must be retained after the cold drawing to perform the cold heading.

Following Mr. Jameson's address, the audience remained to hear the broadcast of President Roosevelt's address and to see the motion picture entitled "The Story of Neoprene".

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by Harry B. Pulsifer, Metallurgical Engineer, American Metal Treating Co., and Consulting Metallurgist, Ferry Cap and Set Screw Co., Cleveland, Ohio

To help speed inspection of metals used in national defense, the American Society for Metals is making available at cost this new, authoritative 180-page book on metal inspection. Written in non-technical language by an authority in the field, "Inspection of Metals" is designed particularly for those with a limited knowledge of metal-making practice and the testing of metals. This low-priced book will be extremely helpful to defense inspectors and as a text-book in defense courses.

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by H. J. French, in Charge of Alloy Steel and Iron Development, International Nickel Co.

Mr. French's lectures on "Alloy Constructional Steels" were so well received at the 1941 Western Metal Congress that they are now made into book form.

This 275-page book covers alloys in commercial steels—why alloy steels are used—selection of alloy steels—typical commercial uses—commercial steels and manufacturing variables—high alloy steels—wear—how alloying elements may affect corrosion of steels—processing and special treatments.

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by Gordon T. Williams, Metallurgist, Deere & Co., Moline, Ill.

A book on selection of steels for manufacturing purposes based on a series of lectures given before the Tri-City Chapter A.S.M., many of which have been printed in recent issues of Metal Progress.

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Atmosphere for Heat Treating Tools Covered

Reported by G. M. Cover
Associate Professor of Metallurgy Case School of Applied Science

Cleveland Chapter—Coffee talker at the regular monthly meeting on Dec. 1 was E. A. Rossrucker of Ohio Bell Telephone Co., who spoke on "The American Legion's Position Today".

The technical speaker was Sam Tour of Lucius Pitkin, Inc. "Furnace Atmospheres for Heat Treatment of Tools and Special Steels" was his subject.

In burning rich mixtures of fuel gas and air, the composition of the products of combustion from a given ratio of gas to air are found to be dependent upon the temperature of the combustion chamber. At low combustion chamber temperatures heavy soot deposits result and the gaseous products of combustion are low in hydrogen and carbon monoxide and high in water and volatile hydrocarbons.

Reactions Are Exothermic

At high combustion chamber temperatures coke deposits result and the gaseous products of combustion are high in hydrogen and carbon monoxide and low in water vapor.

Very seldom are the reactions truly endothermic. They are usually true exothermic combustion reactions.

An intermediate temperature range of 1600 to 1900° F. may be used where difficulties due to heavy soot or heavy coke do not develop. This range is wide enough to allow for a considerable variation in the gaseous products of combustion. Temperature control within this range gives uniform performance.

The speaker emphasized that all gases used are exothermic and that catalysts cannot change the equilibrium but simply help drive the reactions on to equilibrium. Water vapor in the gas acts as an oxidizer on the material being heat treated, while hydrogen is a deoxidizer, reducer and decarburizer.

Heat Sources

Heat may be applied to the combustion chamber by: *(a)* Preheating the air and gas mixture, *(b)* radiant tube heaters, *(c)* electric resistance elements outside the combustion chamber, *(d)* Globar tubes, *(e)* surrounding the chamber with another combustion chamber.

Water vapor is one of the major products resulting from the combustion of fuel gas and air mixtures. The standard methods of gas analysis applied to furnace atmospheres give compositions of the gases as cooled to room temperature. During this cooling of the gases, the surplus water vapor is condensed to water and removed until the remaining gases are saturated at the temperature of analysis.

Removing Water Vapor

Assuming that no other gas reactions take place during cooling, the results could be recalculated to correct for this loss of water if the total original amount of water were known. With certain simple fuel gases and known air-gas ratios, the total water vapor can be calculated.

The over-all gas atmosphere composition is affected by the water vapor present. By cooling to remove the water and then reheating, the composition may be caused to change. By removing the water vapor and reheating, it is possible to reduce the amounts of residual hydrogen and carbon dioxide and increase the residual carbon monoxide.

Gives History, Applications of Induction Heat

Reported by H. T. Clark
Research Physicist, Jones & Laughlin Steel Corp.

Pittsburgh Chapter—An interesting discussion on surface hardening of steel by induction heating was presented by Dr. H. B. Osborn, Jr., of the Tocco Division of the Ohio Crankshaft Co. on Jan. 8.

The mechanism of induction heating was explained in some detail and the basic equipment described. The significance of frequency regulation as a means of control of depth of hardening and the use of high frequencies for hardening of irregularly shaped objects was mentioned.

The use of repeated heating and quenching cycles for certain special applications was pointed out as an example of the variability of technique possible for the method.

The first application of induction heating for surface hardening was to crankshafts made by the parent company and Dr. Osborn traced the development directly to the increased demands placed on this part by motor designs involving higher and higher pressures on the bearing surfaces. The complicated shape of the part made the application of this method of heating a logical choice for it permitted the local heating of the surfaces to be hardened and decreased the danger of warping.

Induction heating has since been applied to a large number of parts with success and some of the advantages cited are the excellent surface obtained, the speed of the operation, the maintenance of shape of the part, and the saving in space requirements and cost.

Dr. Osborn indicated that this method produced somewhat different properties in the steel as compared with the conventional methods of heating in a furnace.

Induction hardening results indicate that under proper conditions less than 1 sec. is required for complete transformation to the austenitic condition. This is evidenced by the development of maximum hardness and the absence of carbides in the hardened zone of such steels as S.A.E. 1050.

The hardened structure does not show acicular martensite typical of furnace hardening but rather a nodular structure which seems to be characteristic of the rapid heating. Also, the hardness developed is somewhat in excess of the values previously reported as being maximum for the usual furnace heating.

Joint Meeting With Tool Engineers Is On Mo High Speed Steel

Reported by J. M. Keating
Chemist, Eastman Kodak Co.

Rochester Chapter — "Molybdenum High Speed Steel and Its Manufacture, Heat Treatment and Application" was the subject of an address given by W. H. Wills, metallurgist, Allegheny Ludlum Steel Corp., before a joint meeting with the American Society for Tool Engineers on Jan. 14 at the University of Rochester.

He said that with our defense program operating at full speed, machine tools and particularly the tools that go with them occupy a very important position. High speed steel is one of the most important materials from which these cutting tools are made.

The production of high speed steel requires a continuous supply of such alloys as tungsten, molybdenum, chromium, vanadium and cobalt. The present status of these alloys was briefly covered. Molybdenum high speed steels have assumed an important place today as a substitute for the tungsten high speed steels.

After a few remarks on the history of molybdenum high speed steels, the types now on the market were described. These steels were discussed from the standpoint of heat treatment as covered by the recent OPM report.

Following this, numerous cases were mentioned where these steels have been used for various kinds of cutting tools with satisfactory results.

Mr. Wills' address was preceded by a dinner and talk by Mr. Trost, F.B.I. agent in Buffalo, on "Industrial Protection".

HERE AND THERE WITH A. S. M. MEMBERS

ROY G. ROSHONG, past chairman, Canton-Massillon Chapter A.S.M., currently a member of the METAL PROGRESS Editorial Advisory Board, has resigned his position as metallurgist with Lindberg Steel Treating Co. to engage in consulting work with Harvey S. Pardee and Associates, Chicago.

Roy G. Roshong

Roy has been with Lindberg since 1936. Before that he was metallurgist of the Hoover Co. in Canton, Ohio. He is a graduate metallurgical engineer from University of Cincinnati and held various positions in Canton and Dayton before going to Chicago.

* * *

R. J. RICE, metallurgist of Metal Goods Corp., Houston, Texas, has been appointed staff expert, Manganese and Chrome Branch, War Production Board in Washington. Mr. Rice is a member of the Texas Chapter and is widely known in the Southwest.

He has been granted a leave of absence from Metal Goods Corp. and will act in an advisory capacity in the coordination of production, transportation, and consumption of manganese and chromium.

VERNER LINDSTROM, who reports activities of the Buffalo Chapter for THE REVIEW, is now in the research laboratory of The Linde Air Products Co. at Tonawanda, N. Y. He was formerly chemist for J. H. Williams & Co., Buffalo.

* * *

BLISS & LAUGHLIN, INC. has announced the appointment of CLYDE LLEWELYN as assistant to the president with headquarters at Harvey, Ill.

Mr. Llewelyn entered the employ of Bliss & Laughlin in October 1928 as a metallurgical engineer in the Harvey plant. In 1929 has was transferred to Buffalo and made chief of the metallurgical department of the new plant which had just been completed. Later he was appointed general superintendent of the Buffalo plant. He is a past chairman of the Buffalo Chapter of the A.S.M.

During the past 20 months he has been in charge of the company's problems pertaining to the handling of priorities, allocations, and clarification of Government specifications. He now spends much of his time in Washington and will continue there in this capacity.

* * *

MAJOR A. W. SIKES, C.W.S., past chairman of the Chicago Chapter, has recently been announced as chemical officer, Headquarters Sixth Corps Area, U. S. Army, replacing Lt. Colonel Carnachan, who has been transferred to the Pine Bluff Arsenal in Arkansas.

Stoughton Gives Talk on Metallurgy in Defense

Reported by E. P. Klier
Graduate Assistant, University of Notre Dame

Notre Dame Chapter—President Bradley Stoughton and Secretary W. H. Eisenman were guests of the Chapter at the Jan. 7th meeting.

In his brief preliminary talk, Mr. Eisenman told how the Society is cooperating with the Government concerning the metals industries and cited, as one example, the collaboration during the past summer between the Society and the OPM with regard to high speed steels.

Professor Stoughton spoke on "Metallurgy in the Defense Program". The lecture covered the various important metals with regard to the amounts needed, the amounts now on hand, and the possibilities of obtaining those ores not now available in this country.

Metallurgical Teaching Should Build on Historical Basis, Hoyt Tells Students

Reported by Dennis J. Carney
Pennsylvania State College

Penn State Chapter—At the January meeting Dr. Samuel Hoyt spoke on the teaching of metallurgy.

The speaker stated that teaching metallurgy is a subject that has always been of particular interest to him. He believes that the best way to begin a metallurgical subject is to start with a historical background and build up to present-day conditions instead of the conventional method of starting the subject as it is today.

Dr. Hoyt sectioned his approach to metallurgy into three parts: First, craftsmanship; second, engineering; and third, science.

Craftsmanship extended from the Stone Age up to the Dark Ages, engineering from the Renaissance until the end of the nineteenth century, and science from the end of the nineteenth century until today. Using those three as a basis, the speaker went on to show how each contributed to modern metallurgy.

Richardson Tells of Long Research in Ancient Iron & Steel

Reported by J. M. Gotshall
Ass't Chief Chemist
Timken Steel and Tube Division

Canton-Massillon Chapter — H. C. Richardson of Republic Steel Corp. brought to the meeting on Jan. 11 a very interesting acount of "Ancient Iron and Steel" which he has compiled over a long period of literary and metallurgical research.

He stated that meteoric fragments were man's first source of this metal; as the use of iron increased, preparation from ores was developed.

Slides used to illustrate the talk showed the first crude furnaces with natural draft in which iron ore was reduced. These were followed by forced draft furnaces, bellows furnishing the blast.

Indication of carburization was evidenced by one slide and it was pointed out that Pliny wrote of quenching in oil, which showed quite a knowledge of treatments for such early times.

Mr. Richardson has examined and studied many pieces from all parts of the world, sent to him by various museums and others interested in ancient irons. He has assisted greatly in bringing to us a knowledge of the processes and fabrication of these ancient metals.

C. R. Bearmore of the American Athletic Union showed pictures of various championship meets and Olympic competition immediately after the dinner, explaining the various events as the films progressed. Mr. Bearmore is official photographer for the A.A.U. and is also connected with the Y.M.C.A.

About 80 members and guests were honored with the presence of Norman F. Tisdale, vice-president and metallurgical consultant of the Molybdenum Corp. of America and national trustee of the A.S.M.

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NON-FERROUS CHEMIST: Experienced man for permanent position in analysis of brass, bronze, bearing metals, aluminum, and magnesium. Knowledge of ferrous, organic, and miscellaneous analysis desirable. State in first letter full experience, background, and approximate salary expected. Middle west location. Correspondence strictly confidential. Inquiries desired from qualified applicants only. Box 2-5.

COLLEGE GRADUATE: Aged 27 to 35 years, having at least three years industrial experience in metallography and analytical chemistry wanted for research work in a progressive organization in Chicago area. Candidate must be fast and accurate, particularly in metal analyses, and must have ability for research work and report writing; must be able to assume responsibility for carrying an outlined research program to completion. Excellent opportunity for advancement. Give full details of experience, education, personal data, salary requirement, and enclose a snapshot. Box 2-10.

COMBUSTION ENGINEER: American citizen. Must have had actual steel mill experience with complete knowledge of arc and induction electric melting furnaces, ingot preheaters, reheating furnaces fired by both natural and anthracite gas, annealing furnaces, atmospheric generators, steam boilers, hand and stoker reheating billet furnaces, and anthracite gas producer plants. Eastern location. Box 2-15.

METALLURGIST AND HEAT TREATER: Good technical and practical background. For high alloy steel ordnance work, Cleveland district. Needed by March 1. Attractive salary. Box 2-20.

SUPERINTENDENT: Experienced in heat treating to take charge of two heat treat departments, a plating department, and a painting department. Must be able to handle men and get quality and production; cooperation essential. Excellent salary. Midwest. Box 2-25.

GRADUATE METALLURGIST: For research and control work in Michigan foundry making gray iron automotive castings, which are machined and marketed in both service and original equipment field. To work under chief metallurgist. Salary open. Box 2-35.

ALUMINUM AND MAGNESIUM Fabrication: Government agency needs man familiar with metal fabricating operations to assist in program of expanding fabricating facilities for aluminum and magnesium. Should have mechanical background. Work will involve visits to various fabricating plants to appraise their suitability to undertake work required by the War Program. Box 2-40.

Positions Wanted

METALLURGIST: 30 years old; graduate of Rensselaer Polytechnic Institute. Experience in tools steels, production steels, special alloy steels, stainless, and some nonferrous; inspection, testing, research and shop problems. Salary open. Box 2-30.

CHEMIST AND METALLURGIST: Age 33, married, American. Training in chemistry, X-ray diffraction and radiography. Experience in chemical and metallurgical research at governmental and nationally known institute. Location Ohio or southern Michigan. Box 2-45.

METALLURGIST: Age 29, B.S. Penn State College, 1934. Six years experience in testing and inspection with steel manufacturer; experimental work in physical testing, heat treating, and metallographic examination. Would like position working on consumers' metallurgical problems; particularly interested in tool manufacture. Box 2-50.

Tee-Bend Test Gives Indication of Welding Quality of Steels

Reported by Forrest R. Nagley

Materials Engineer, Bureau of Ships
Navy Dept.

Washington Chapter — At a joint meeting with the local chapter of American Welding Society, a Bureau of Standards technical paper was presented by its senior author.

George A. Ellinger, the speaker, is a metallurgist at the National Bureau of Standards and to him is due much credit for the technical development of the "Tee-Bend" test as a method for determining the weldability of alloy steels.

A. G. Bissell, a co-author of the paper and senior welding engineer of the Bureau of Ships, Navy Department, also presented comments on various phases of the experimental work and on certain interpretations of test results.

M. L. Williams, of the National Bureau of Standards, is also one of the co-authors of this paper, which was published in the January 1942 issue of the *Journal of Research*, National Bureau of Standards (Research Paper No. 1444).

According to the findings of the investigation, not all metals are equally satisfactory for welding, and different welding techniques are necessary for making the same types of joints in different metals.

In selecting the metal best adapted for a structure to be assembled by welding, the welding quality of the metal is of prime importance, as well as the strength quality required by design and utility.

The welding of mild steel offers little difficulty, provided proper attention is given to design and welding technique. However, the high tensile, low alloy steels often differ in welding qualities.

In this investigation the welding quality of 18 commercial steels was studied by means of the bending of fillet and welded Tee specimens in special ("Guided") jigs. The data obtained were evaluated by statistical analysis.

Michigan Tech Sponsors Queen Candidate

Charming Miss Alice Brodeur, Michigan Tech's A.S.M. Candidate for Winter Carnival Queen, Was Formally Introduced to the Chapter by Norman Kates, Chairman (Right) and Robert Oliver, Instructor of X-Rays (Left).

Tribute to Stoughton Traces Early Career

British Columbia Chapter—A well-deserved tribute to National President Bradley Stoughton and some interesting reminiscences were contained in an introductory speech by H. Mortimer-Lamb, past secretary of the Canadian Mining Institute and now a resident of Vancouver, at the meeting on Jan. 12.

Mr. Mortimer-Lamb said that he considered it a pleasure and a great privilege to pay a tribute to a man for whom he had the greatest admiration and respect. This admiration and respect, he said, "is shared to no less degree by a vast number of people engaged in the mining and metallurgical industry throughout the world.

"I know him best as a very human person, with whom I first came in contact some 25 years ago when he was secretary of the American Institute of Mining and Metallurgy, and the friendship that then resulted I have for my part always treasured.

"To meet and know men like Stoughton is a liberal education and an inspiration. He raises one's conception of human nature, and makes one feel that after all mankind may reach a higher destiny in a world that at the moment is so unpleasant a place in which to live, largely due to the folly of mankind, the basis of which is unintelligent selfishness. In short, the ideals of Dr. Stoughton are the ideals of the highest type of those leaders of the English-speaking peoples for whom today we can thank God.

"He gave some expression to these ideas, I remember," Mr. Mortimer-Lamb continued, "in an after-dinner speech at an annual meeting of the Canadian Institute in Ottawa during the last war —I think either in 1915 or 1916— which, for eloquence and fine sentiment could not have been surpassed. The applause was overwhelming, especially when, in calling attention to the conjunction side by side of the Stars and Stripes and the Union Jack decorating the wall, he expressed the hope that this typification of union might permanently endure."

Mr. Mortimer-Lamb then called attention to the excellent biography of Dr. Stoughton in the December issue of METAL PROGRESS, and stressed the humanitarian side of his nature. "If he were merely a distinguished metallurgist," he said, "I think it would have been a hard job to induce me to leave my own fireside this evening."

X-Ray Head Speaks on Practical Applications in Metallurgical Inspection

Reported by I. J. Levinson

Michigan College of Mining and Technology

Michigan Tech Chapter — Beautiful Miss Alice Brodeur was chosen to represent the chapter in the annual Winter Carnival Queen Contest held at the school. Following tradition, each professional society and fraternity elects a fair Copper Country maid to represent it. Chairman Norman Kates, who formally introduced Miss Brodeur to the Chapter at the last meeting, assured Alice of her winning.

Robert Oliver, in charge of the Division of X-rays in the Department of Metallurgical Engineering at the College, was the speaker of the night, his topic being "The Practical Use of X-rays in Metallurgical Inspection".

He discussed the history of X-rays from Roentgen to the present day. Application of X-rays in the routine inspection of welds, castings and assemblies was described.

He spoke of the X-ray research done in the field of recrystallization, fatigue and work hardening. The talk was concluded by a series of slides depicting the actual use of X-rays in the metal industries.

Difficulties in Substituting Steel for Brass in Shells

Reported by Robert D. Stout

Lehigh University

Lehigh Valley Chapter—At a joint meeting with the Lehigh Valley Section of the American Institute of Mining and Metallurgical Engineers, held Jan. 2, the respective chairmen voiced the sentiment that this should be made the first of a series of annual co-meetings.

As the technical speaker, R. S. Pratt, metallurgist of the Bridgeport Brass Co., discussed "Problems of Shell Case Manfacturing".

Mr. Pratt discussed the physical and chemical properties which make brass peculiarly suited for shell cases. In this connection, he pointed out some of the difficulties which must be solved if steel is to be successfully substituted so that shortages of copper and zinc can be relieved.

In addition, the speaker showed the differences in strength and ductility which must exist at various points in the case for satisfactory performance. These figures are obtained by the proper combinations of cold work and local annealing.

Metallurgical Developments Conserve Vital Materials

Reported by Richard Grinndal

International Harvester Company

Chicago Chapter — "President's Night" was the feature of the January meeting.

President Stoughton's address on "Metals and Metallurgists in the Defense Program" outlined several new developments in metallurgical processes which are designed to conserve vital defense materials.

The position of the nation's supply and production of metals was explained, as were some of the reasons for constantly changing priority rulings governing strategic metals.

Bill Eisenman's coffee talk covered recent activities of the A.S.M., particularly those projects which have benefited metallurgists and manufacturers engaged in defense work.

Dr. M. A. Grossmann of the Carnegie-Illinois Steel Corporation was presented with a medal for his services to the American Society for Metals.

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Baltimore	Mar. 16	Engineers' Club		National Officers' Night
Boston	Mar. 6			Joint Meeting with American Welding Society
British Columbia	Mar. 19	Brock Memorial Bldg.	F. A. Forward	Steel: Its Structure and Alloys
Buffalo	Mar. 12	Hotel Buffalo	Bradley Stoughton	National President's Night
Calumet	Mar. 17	Woodmar Country Club, Hammond, Ind.	Col. Donald Armstrong	Army Ordnance
Canton-Mass.	Mar. 19		Earnshaw Cook	Steel Plant Practices
Chicago	Mar. 12	Chicago Bar Assoc.	Donald B. Armstrong	Ballistics
Cleveland	Mar. 2	Cleveland Club	W. P. Sykes	Hard Alloys
Columbus	Mar. 10	Fort Hayes Hotel	Dr. Faust	Why Electroplate?
Dayton	Mar. 11	Engineers Club	Charles L. Faust	Electroplating
Detroit	Mar. 9			
Hartford	Mar. 10	Hartford Gas Co.	N. L. Deuble	Service Failures
Indianapolis	Mar. 16	Washington Hotel	Arthur E. Focke	Hardenability
Lehigh Valley	Mar. 6	Hotel Traylor, Allentown, Pa.	B. Clements	Aircraft Engine Materials
Los Angeles	Mar.	Scully's Cafe	R. S. Smith	Heat Treating Problems in the Aircraft Industry
Milwaukee	Mar. 17	Milwaukee Athletic Club	Symposium	Welding
Montreal	Mar. 2	Windsor Hotel	Bradley Stoughton	National Officers' Night
New Haven	Mar. 19	Hotel Barnum, Bridgeport, Conn.	Malcolm F. Judkins	Metal Cutting
New Jersey	Mar. 16	Essex House, Newark	Raymond W. Young	Aircraft Engines
New York	Mar. 9	Bldg. Trade Employers Assoc. Clubrooms	A. J. Williamson	Seamless Steel Tubing
North West	Mar. 18	Coffman Memorial Union, Univ. of Minn.	O. J. Horger	Fatigue of Steel
Northwestern Pennsylvania	Mar. 12	Warren, Pa.	H. P. Rassbach	Electric Steel Melting
Notre Dame	Mar. 11	Engineering Audit., Univ. of Notre Dame	N. B. Pilling	Applications of Research in Nickel Alloys
Ontario	Mar. 6	Hamilton	Walter Crafts	Deoxidation of Liquid Steel
Peoria	Mar. 9		S. C. Massari	Foundry Problems and Manufacture of Chilled Car Wheels
Philadelphia	Mar. 27	Engineers Club	Stanley P. Watkins	Some Practical Aspects of Stainless Steel Metallurgy
Pittsburgh	Mar. 12	Roosevelt Hotel		Young Fellows' Night
Rhode Island	Mar. 4			Heat Treaters' Night
Rochester	Mar. 9	Lower Strong Audit., Univ. of Rochester	P. B. Greenawald	Stainless Steel
Rockford	Mar. 29	Elks Club		Forum
Saginaw Valley Group	Mar. 17	Durant Hotel, Flint, Mich.	J. H. Van Deventer	Editorial Comments
Springfield	Mar. 16	Western Mass. Electric Co., Greenfield	E. C. Betz	Magnafluxing
St. Louis	Mar. 20	York Hotel	J. F. Robb	Gray Cast Iron—An Economical Engineering Material
Syracuse	Mar. 3			
Toledo Group	Mar. 23	Hillcrest Hotel	George Halliwell	Aluminum and Manganese Bronzes for Defense Work
Tri-City	Mar. 10	Hotel Ft. Armstrong, Rock Island, Ill.	P. C. Cunnick	Inspection of Ordnance Materials
Worcester	Mar. 11	Sanford Riley Hall, W.P.I.	E. S. Davenport	Isothermal and Cooling Transformation in Carbon and Alloy Steels
York	Mar. 11	Gettysburg College	Harry L. Hovis	Chemistry and Metallurgy in the Watch Industry